Attorney Docket No. 0756-1896

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:	)	Group Art Unit: 2814
Hisashi OHTANI et al.	)	Examiner: P. Cao
Serial No. 09/197,767	)	CERTIFICATE OF MAILING
Filed: November 23, 1998	)	I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on March 14, 2005.
For: SEMICONDUCTOR DEVICE AND PROCESS FOR PRODUCING THE SAME	)	Ashlee M Stamper

APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 35 U.S.C. § 134 and 37 C.F.R. § 1.192(a), Appellants submit this Appeal Brief to appeal the examiner's final rejection of claims 1-5, 16, 22-27, 40 and 46-74 in the Official Action mailed July 14, 2004, and in the Advisory Action mailed December 15, 2004. A *Notice of Appeal* was filed January 14, 2005.

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I. REAL PARTY IN INTEREST

The named inventors have assigned all ownership rights in the pending application to Semiconductor Energy Laboratory Co., Ltd., 398, Hase, Atsugi-shi, Kanagawa-ken, 243-0036, Japan, which is the real party in interest.

II. RELATED APPEALS AND INTERFERENCES

The appellants, their legal representatives, and the assignee are not aware of any other prior or pending appeals, interferences or judicial proceedings which will directly affect or be directly affected by, or have a bearing on the Board's decision in this appeal.

III. STATUS OF THE CLAIMS

Claims 1-5, 16, 22-27, 40 and 46-74 are pending in the present application, of which claims 1-5 and 47-50 are independent. Claims 1-5, 16, 22-27, 40 and 46-74 are rejected, and claims 6-15, 17-21, 28-39 and 41-45 are canceled. No claims have been deemed allowable by the examiner.

IV. STATUS OF AMENDMENTS

A *Supplemental Amendment* under § 1.116 has been filed concurrently herewith which presents the rejected claims in better form for consideration on appeal. The amended claims have been included in Appendix A. Thus, the status of the claims in this application is as set forth above and in Appendix A.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention relates to a semiconductor device comprising at least one transistor (page 18, lines 4-5, 23; page 24, lines 3, 4, 22; page 31, lines 4, 6, 8, 9; page 32, line 12; page 33, lines 3, 8); at least one interlayer insulating film formed over the transistor, the interlayer insulating film having at least one contact hole; an embedded conductive layer provided to fill the contact hole; and a reflective pixel electrode, formed on the interlayer insulating film where the reflective pixel electrode is electrically connected to the transistor through the embedded conductive layer.

The above-referenced features are supported in the specification and drawings as noted, for example, in the following table:

	Figure 1 (pages 9-12)	Figure 2 (pages 12-14)	Figures 3A-5C (pages 14-20)	Figures 6A-8C (pages 20-27)	Figure 9 (pages 29-30)	Figure 10 (pages 30-31)
Transistor	100, 101	200, 201	312-332	612-632	312-332	612-632
Interlayer Insulating Film	102	202	335, 337	635, 637	335, 337	635, 637
Contact Hole	103	203	Figure 5A	Figure 8A	Figure 5A	Figure 8A
Embedded Conductive Layer	104	204	341, 342	641, 642	905, 906	1005, 1006
Reflective Pixel Electrode	105, 106	205, 206	343, 344	643, 644	901, 902	1001, 1002

A top surface of the embedded conductive layer may be flush with a top surface of the interlayer insulating film (e.g. Figures 1B, 2B, 5B, 8B), and the reflective pixel electrode may have a flat upper surface thereon (e.g. 106, 206; Figures 1B, 2B, respectively). The embedded conductive layer may comprise (1) a conductive material dispersed in a medium, the conductive material being selected from the group consisting of carbon, zinc oxide, aluminum, and nickel (e.g. page 7, lines 14-16); (2) a same resin as the resin of the interlayer insulating film (e.g. page 12, lines 3-4); or (3) an indium tin oxide (e.g. page 7, line 31 to page 8, line 9; page 12, lines 24-25; page 21, line 2). The interlayer insulating film may comprise an organic resin film (e.g. page 9, line 29 to page 10, line 3; page 11, lines 21-22; page 12, line 30 to page 13, line 2; page 19, lines 19-22; page 25, lines 15-18).

The semiconductor device may further comprise a drain electrode formed on the first interlayer insulating film and electrically connected to a drain of the transistor through an opening of the first interlayer insulating film (e.g. Figures 4C, 7C); a second interlayer insulating film formed over the drain electrode and the first interlayer insulating film, and a capacitor forming electrode formed on the second interlayer insulating film to form a capacitor between the drain electrode and the capacitor forming electrode (e.g. Figures 4D, 7D); a third interlayer insulating film formed over the capacitor forming electrode and the second interlayer insulating film, and the contact hole opened through the third and

second interlayer insulating films to reach the drain electrode (e.g. Figures 5A, 8A); where a cross sectional shape of the contact hole is tapered (e.g. Figures 1A, 2A).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Claims 1, 2, 5, 16, 22-27, 40, 47, 48, 51, 52, 55, 56, 59, 60, 63, 64, 67, 68, 71 and 72 are rejected under 35 U.S.C. § 112, first paragraph.

B. Claims 1, 2, 5, 16, 22-27, 40, 46-48, 51, 52, 55, 56, 59, 60, 63, 64, 67, 68, 71 and 72 are rejected as obvious based on the combination of U.S. Patent No. 5,536,950 to Liu et al., U.S. Patent No. 5,706,064 to Fukunaga et al. and U.S. Patent No. 6,400,428 to Izumi. Claims 2, 22-27, 40, 48, 52, 56, 60 and 64 are also rejected as obvious based on the combination of Liu, U.S. Patent No. 5,990,542 to Yamazaki, Fukunaga and Izumi.

C. Claims 3, 4, 22-27, 40, 49, 50, 53, 54, 57, 58, 61, 62, 65, 66, 69, 70, 73 and 74 are rejected as obvious based on the combination of U.S. Patent No. 6,081,305 to Sato et al., U.S. Patent No. 6,097,453 to Okita, and one or more of Fukunaga, U.S. Patent No. 5,644,370 to Miyawaki et al. and Yamazaki.

VII. ARGUMENTS

A. Claims 1, 2, 5, 16, 22-27, 40, 47, 48, 51, 52, 55, 56, 59, 60, 63, 64, 67, 68, 71 and 72 are rejected under 35 U.S.C. § 112, first paragraph.

Paragraph 1 of the Final Official Action rejects claims 1, 2, 5, 16, 22-27, 40, 47, 48, 51, 52, 55, 56, 59, 60, 63, 64, 67, 68, 71 and 72 under 35 U.S.C. § 112, first paragraph, asserting that the claims fail to comply with the written description requirement.

It is noted that the Advisory Action did not specifically address the arguments presented in the *Response* filed November 15, 2004, and it is unclear whether the § 112 rejection has been overcome by those arguments.

The Official Action asserts that "having a flat upper surface thereon" is not supported by the original disclosure. The appellants respectfully disagree and traverse the above-referenced assertions.

The appellants respectfully submit that the feature of a reflective pixel electrode having a flat upper surface thereon is supported in the specification, for example, at page 6, line 30, to page 7, line 1 and at page 12, lines 12-19 (referring to Figure 1C; a similar discussion may be found with respect to Figure 2C at page 14, lines 22-29). Therefore, the appellants respectfully submit that claims 1, 2, 5, 16, 22-27, 40, 47, 48, 51, 52, 55, 56, 59, 60, 63, 64, 67, 68, 71 and 72 are adequately described in the specification. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 112 are in order and respectfully requested.

B. Claims 1, 2, 5, 16, 22-27, 40, 46-48, 51, 52, 55, 56, 59, 60, 63, 64, 67, 68, 71 and 72 are rejected as obvious based on the combination of U.S. Patent No. 5,536,950 to Liu et al., U.S. Patent No. 5,706,064 to Fukunaga et al. and U.S. Patent No. 6,400,428 to Izumi. Claims 2, 22-27, 40, 48, 52, 56, 60 and 64 are also rejected as obvious based on the combination of Liu, U.S. Patent No. 5,990,542 to Yamazaki, Fukunaga and Izumi.

Paragraph 2 of the Final Official Action rejects claims 1, 47, 51, 55, 59, 63, 67, 68, 71 and 72 as obvious based on the combination of U.S. Patent No. 5,536,950 to Liu et al., U.S. Patent No. 5,706,064 to Fukunaga et al. and U.S. Patent No. 6,400,428 to Izumi. Paragraph 3 of the Final Official Action rejects claims 2, 22-27, 40, 48, 52, 56, 60 and 64 as obvious based on the combination of Liu, U.S. Patent No. 5,990,542 to Yamazaki, Fukunaga and Izumi. Paragraph 7 of the Final Official Action rejects claims 5, 16, 22-27, 40 and 46 as obvious based on the combination of Liu, Fukunaga and Izumi. Paragraph 8 of the Final Official Action rejects claims 1, 2, 5, 22-27, 40, 47, 48, 51, 52, 55, 56, 59, 60, 63, 64, 67, 68, 71 and 72 as obvious based on the combination of Fukunaga, Liu and Izumi. The appellants respectfully traverse the rejections because the Official Action has not made a *prima facie* case of obviousness.

As stated in MPEP §§ 2142-2143.01, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available

to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. "The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." In re Kotzab, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). See also In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); In re Jones, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

There is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify Liu and Izumi or to combine reference teachings to achieve the claimed invention. MPEP § 2142 states that the examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. It is respectfully submitted that the Official Action has failed to carry this burden. While the Official Action relies on various teachings of the cited prior art to disclose aspects of the claimed invention and asserts that these aspects could be used together, it is submitted that the Official Action does not adequately set forth why one of skill in the art would combine the references to achieve the features of the present invention.

The present invention is directed to a semiconductor device (e.g. Figures 3A-5C) comprising at least one transistor (e.g. 312-332); at least one interlayer insulating film (e.g. 335, 337) formed over the transistor, the interlayer insulating film having at least one contact hole (e.g. Figure 5A); an embedded conductive layer (e.g. 341, 342) provided to fill the contact hole; and a reflective pixel electrode (e.g. 343, 344), formed on the interlayer insulating film where the reflective pixel electrode is electrically connected to the transistor through the embedded conductive layer. Other embodiments of the present invention have similar features as noted in the Table provided above.

Liu is directed to a transmitting type LCD cell design. Liu is relied upon to teach the structure shown in Figure 4G. The Official Action relies on doped oxide layer 78 for the teaching of an interlayer insulating film; on tungsten plug 82 for the teaching of an embedded conductive layer, and on second transparent metal TM2 for the teaching of a pixel electrode. Liu does not teach or suggest a reflective type LCD display.

In pertinent part, the Official Action asserts that "it also would have been obvious to form Liu's pixel electrode being either a transparent electrically conductive film or a reflective electrical conductive film depending upon the display device type which is desired for the liquid crystal display device, as taught by Izumi (column 6, lines 15-20)" (page 4, Paper No. 0704). The Official Action is referring to the following statement in Izumi: "Each pixel electrode 15 is a transparent electrically conductive film made of ITO (Indium Tin Oxide) or the like when used for a light transmitting type display device and a reflective electrically conductive film made of aluminum (Al) or the like when used for a reflecting type display device."

Although it is not entirely clear what combination of features of Liu and Izumi and what specific changes are to be made, it appears that the Official Action is arguing that it would have been obvious to not only use reflective pixel electrode 15 of Izumi in lieu of transparent metal (pixel electrode) TM2 of Liu, but to also convert the transmitting type LCD device of Liu into a reflective type LCD device, simply because Izumi teaches use of a transparent film for a light transmitting type display device and use of a reflective film for a reflective type display device. However, Izumi appears to merely associate one type of film with one type of display device. Izumi does not teach or suggest using a reflecting film in a transmitting type display or a transparent film in a reflective type display. As noted below, the Official Action concedes that to do so would not make sense. The appellants respectfully submit that the alleged motivation to combine Liu and Izumi is insufficient to teach one of ordinary skill in the art at the time of the present invention that it would have been obvious to convert the transmitting type display device of Liu into a reflective type display device, which would be required to render obvious the claims of the present application, or even that such conversion would be possible without destroying the underlying structure of Liu.

In the "Response to Arguments" section, the Official Action asserts that "the combined teachings of the references would have suggested to those of ordinary skill in the art [to combine Liu and Izumi] because Izumi clearly suggests that the display device electrode of Liu can have a pixel electrode made of either a transparent electrically conductive film or a reflective electrically conductive film depending upon the display device which is desired for the liquid crystal display device" (page 12, Paper No. 0704). The appellants respectfully disagree.

Liu discloses the following: (1) that an aperture ratio is an important factor influencing a power requirement of an AMLCD and has an object of increasing the aperture ratio (see column 1, lines 29-33, and column 2, lines 62-65); (2) that a transparent metal (ITO) is used as a pixel electrode (see column 5, lines 40-41); and (3) that a high aperture ratio is achieved by their invention, and that the high aperture ratio allows use of a lower power backlight. In view of these disclosures, it is clearly understood that Liu's liquid crystal display device is a transmitting type liquid crystal display device. Even though Izumi appears to disclose that a pixel electrode may be a transparent electrically conductive film for a transmitting type device or a reflective electrically conductive film for a reflective type device (see column 6, lines 15-19), this is not sufficient, in and of itself, to suggest that the entire device of Liu should be changed in a manner which would obviate the stated object of the invention, that is, changing the transmissive pixel electrode of Liu into a reflective pixel electrode and all other changes that would have to be made in Liu in order to achieve a functional device. In other words, even though the Izumi device may use a transparent electrically conductive film or a reflective electrically conductive film, this is not sufficient to teach that a transparent electrically conductive film or a reflective electrically conductive film could be used in any device, particularly in the Liu device, where use of a transmitting type LCD is one of the objects of the invention.

Also, pages 2-4 of the *Advisory Action* mailed December 15, 2004, appear to give an excessively narrow interpretation to the arguments at page 3 of the *Response* filed November 15, 2004 (reproduced above). The appellants are not merely arguing that Izumi teaches applying a transmissive electrode to a transmissive device or a reflective electrode to a reflective device. Rather, the appellants' argue that Izumi does

not teach one of ordinary skill in the art at the time of the present invention to change the transmissive device of Liu into a reflective device.

The appellants specifically note an admission at the sentence bridging pages 2 and 3 of the *Advisory Action*, i.e. "Therefore, from the teaching of Izumi, one skilled in the art would not apply the reflective pixel electrode into the transmission type display device of [Liu] as asserted by Applicant because it does not make any [sense]." This admission appears to support appellants' position that the Official Action has not made a *prima facie* case of obviousness. That is, the Official Action agrees that it does not make any sense from the teaching of Izumi for one skilled in the art to apply the reflective pixel electrode of Izumi into the transmitting type display device of Liu. Appellants agree, and continue to argue, quite simply, that the Official Action has not shown how or why one of ordinary skill in the art would have been motivated to change the transmitting type display device of Liu into a reflective type display device. In other words, even if one were to show that it would have been obvious to use reflective pixel electrode 15 of Izumi in lieu of transparent metal (pixel electrode) TM2 of Liu, one would be left with a Liu device that is otherwise adapted for use as a transmitting type display device. Izumi lacks any teaching or suggestion to further convert the alleged combined device of Liu into a functional reflective type device.

Furthermore, even if it were shown that it would have been obvious to one of ordinary skill in the art at the time of the present invention to convert a transmitting type display device such as Liu into a reflective type display device, it is not at all clear that the features relied upon by the Official Action to render obvious the claims of the present invention would not also be changed in the conversion of Liu. That is, when making the hypothetical conversion of the Liu device from a transmitting to a reflective type device, the Official Action has not shown and it is not at all clear that the doped oxide layer 78 (the alleged interlayer insulating film), the tungsten plug 82 (the alleged embedded conductive layer), and the second transparent metal TM2 (the alleged pixel electrode) of Liu would not also be changed or modified in a manner which destroys the basic relationship between the above-referenced elements such that these elements no longer anticipate or render obvious the claims of the present application.

Also, appellants note that an argument has been raised regarding criticality at page 4 of the *Advisory Action*. The appellants note that criticality may be an issue if a *prima facie* case of obviousness is first made, and if the appellants are arguing about secondary conditions such as "unexpected results" (MPEP 716.02), if the Official Action is relying "solely on case law as the rationale to support an obviousness rejection" (MPEP 2144.04) or if the Official Action is arguing about the obviousness of a range of a parameter such as temperature or a concentration (MPEP 2144.05). None of these arguments are being made by appellants. Therefore, appellants respectfully submit that the third argument (page 4 of the *Advisory Action*) is spurious.

For the reasons noted above, the appellants respectfully submit that it would not have been obvious to one of ordinary skill in the art at the time of the invention to change the transmitting type device of Liu into a reflective type device.

Fukunaga and Yamazaki do not cure the deficiencies in the alleged motivation to combine Liu and Izumi. The Official Action relies on Fukunaga to allegedly teach the features of an embedded conductive layer made of ITO or ZnO (page 3, Paper No. 0704) and on Yamazaki to allegedly teach forming an interlayer insulating film made of organic resin (page 4, Id.). Fukunaga and Yamazaki do not teach or suggest that it would have been obvious to one of ordinary skill in the art at the time of the invention to change the transmitting type device of Liu into a reflective type device.

In the present application, it is respectfully submitted that the prior art of record, alone or in combination, does not expressly or impliedly suggest the claimed invention and the Official Action has not presented a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.

Furthermore, with respect to independent claim 5, the prior art, either alone or in combination, does not teach or suggest all the features of the independent claims. Liu, Fukunaga, Izumi and Yamazaki, either alone or in combination, do not teach or suggest that an embedded conductive layer comprises a same resin as a resin of an interlayer insulating film. Since Liu, Fukunaga, Izumi and Yamazaki do not teach or suggest all the claim limitations, a *prima facie* case of obviousness cannot be maintained.

For the reasons stated above, the Official Action has not formed a proper *prima facie* case of obviousness. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a) are in order and respectfully requested.

C. Claims 3, 4, 22-27, 40, 49, 50, 53, 54, 57, 58, 61, 62, 65, 66, 69, 70, 73 and 74 are rejected as obvious based on the combination of U.S. Patent No. 6,081,305 to Sato et al., U.S. Patent No. 6,097,453 to Okita, and one or more of Fukunaga, U.S. Patent No. 5,644,370 to Miyawaki et al. and Yamazaki.

Paragraph 4 of the Final Official Action rejects claims 3, 22-27, 40, 49, 53, 57, 61, 65, 69, 70, 73 and 74 as obvious based on the combination of U.S. Patent No. 6,081,305 to Sato et al., U.S. Patent No. 6,097,453 to Okita, Fukunaga and U.S. Patent No. 5,644,370 to Miyawaki et al. Paragraph 5 of the Final Official Action rejects claims 4 and 50 as obvious based on the combination of Sato, Okita, Miyawaki and Yamazaki. Paragraph 6 of the Final Official Action rejects claims 54, 58, 62 and 66 as obvious based on the combination of Sato, Okita, Miyawaki, Yamazaki and Fukunaga. The appellants respectfully traverse the rejection because the Official Action has not made a *prima facie* case of obviousness.

It is noted that dependent claim 16 is dependent upon claims 1 and 47-50. It appears that claim 16 as it depends from claims 1, 47 and 48 stands rejected based on the above-referenced rejections. However, it does not appear that claim 16 as it depends from claims 49 and 50 is formally rejected. Therefore, in addition to the reasons stated above, dependent claim 16 as it depends from claims 49 and 50 is believed to be in condition for allowance.

The prior art, either alone or in combination, does not teach or suggest all the features of the independent claims. Independent claims 3, 4, 49 and 50 recite a contact hole opened through third and second interlayer insulating films to reach a drain electrode, an embedded conductive layer filled in the contact hole, a reflective pixel electrode formed on the third interlayer insulating film, where the reflective pixel electrode is electrically connected to a drain electrode through the embedded conductive layer. In other words, the embedded conductive layer is filled in the contact

hole, and then the reflective pixel electrode is formed and connected to a drain electrode through the embedded conductive layer. The embedded conductive layer and the reflective pixel electrode are distinct features of the present invention. Without any explicit support for the "embedded conductive layer," the Official Action asserts that Sato teaches "an embedded conductive layer filled in the contact holes; and a reflective pixel electrode 181 is electrically connected to the drain electrode through the embedded conductive layer" (page 6, Paper No. 0704). The appellants respectfully disagree.

Sato does not teach or suggest that an embedded conductive layer is filled in a contact hole, and that a reflective pixel electrode is formed where the reflective pixel electrode is electrically connected to a drain electrode through the embedded conductive layer. Although Figures 2 and 3 of Sato show a line between the portion of electrode 181 formed in the third metal layer (wiring layer) 180, and the portion of electrode 181 formed in through hole 171, nothing in Sato teaches or suggests that these two portions are formed as distinct features. "The wiring 141 is connected to the middle electrode 164 via a through hole 151 and further to the pixel electrode 181 via a through hole 171 and outputs a source voltage of the MOS transistor 1a to the pixel electrode 181" (column 15, lines 2-6). As such, Sato appears to disclose that the electrode 181 itself fills the hole 171. Therefore, Sato does not teach or suggest that an embedded conductive layer is formed, and that a reflective pixel electrode is formed where the reflective pixel electrode is electrically connected to a drain electrode through the embedded conductive layer.

Okita, Fukunaga, Miyawaki and Yamazaki do not cure the deficiencies in Sato and are relied upon to teach features other than those discussed above. Although Fukunaga allegedly teaches an embedded conductive layer made of ITO or ZnO (page 7, Paper No. 0704), Fukunaga does not teach or suggest that the portion of electrode 181 formed in the third metal layer (wiring layer) 180 of Sato could or should be formed as a distinct feature with respect to the portion of electrode 181 formed in through hole 171. Therefore, Sato, Okita, Fukunaga, Miyawaki and Yamazaki, either alone or in combination, do not teach or suggest that an embedded conductive layer is formed,

and that a reflective pixel electrode is formed where the reflective pixel electrode is electrically connected to a drain electrode through the embedded conductive layer.

Since Sato, Okita, Fukunaga, Miyawaki and Yamazaki do not teach or suggest all the claim limitations, a *prima facie* case of obviousness cannot be maintained. Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103(a) are in order and respectfully requested.

For all of the above reasons, the present application is believed to be in condition for allowance and favorable reconsideration is respectfully requested. If the Examiner feels further discussions would expedite prosecution of this application, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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VIII. APPENDICES

APPENDIX A

PENDING CLAIMS

1. (Previously Presented) A semiconductor device comprising:

at least one transistor;

at least one interlayer insulating film formed over said transistor, said interlayer insulating film having at least one contact hole;

an embedded conductive layer provided to fill said contact hole wherein a top surface of said embedded conductive layer is flush with a top surface of said interlayer insulating film; and

a reflective pixel electrode having a flat upper surface thereon, formed on said interlayer insulating film wherein said reflective pixel electrode is electrically connected to said transistor through said embedded conductive layer,

wherein the embedded conductive layer comprises a conductive material dispersed in a medium, the conductive material being selected from the group consisting of carbon, zinc oxide, aluminum, and nickel.

2. (Previously Presented) A semiconductor device comprising:

at least one transistor;

at least one interlayer insulating film comprising an organic resin formed over said transistor, said interlayer insulating film having at least one contact hole;

an embedded conductive layer provided to fill said contact hole wherein a top surface of said embedded conductive layer is flush with a top surface of said interlayer insulating film; and

a reflective pixel electrode having a flat upper surface thereon, formed on said interlayer insulating film wherein said reflective pixel electrode is electrically connected to said transistor through said embedded conductive layer,

wherein the embedded conductive layer comprises a conductive material dispersed in a medium, the conductive material being selected from the group consisting of carbon, zinc oxide, aluminum, and nickel.

3. (Previously Presented) A semiconductor device comprising:

at least one transistor;

a first interlayer insulating film formed over said transistor;

a drain electrode formed on said first interlayer insulating film and electrically connected to a drain of said transistor through an opening of said first interlayer insulating film;

a second interlayer insulating film formed over said drain electrode and said first interlayer insulating film;

a capacitor forming electrode formed on said second interlayer insulating film to form a capacitor between said drain electrode and said capacitor forming electrode;

a third interlayer insulating film formed over said capacitor forming electrode and said second interlayer insulating film;

a contact hole opened through said third and second interlayer insulating films to reach said drain electrode;

an embedded conductive layer filled in said contact hole; and

a reflective pixel electrode formed on said third interlayer insulating film, wherein

said reflective pixel electrode is electrically connected to said drain electrode through said embedded conductive layer,

wherein a cross sectional shape of the contact hole is tapered, and

wherein the embedded conductive layer comprises a conductive material dispersed in a medium, the conductive material being selected from the group consisting of carbon, zinc oxide, aluminum, and nickel.

4. (Previously Presented) A semiconductor device comprising:

at least one transistor;

a first interlayer insulating film formed over said transistor;

a drain electrode formed on said first interlayer insulating film and electrically connected to a drain of said transistor through an opening of said first interlayer insulating film;

a second interlayer insulating film formed over said drain electrode and said first interlayer insulating film;

a capacitor forming electrode formed on said second interlayer insulating film to form a capacitor between said drain electrode and said capacitor forming electrode;

a third interlayer insulating film comprising an organic resin formed over said capacitor forming electrode and said second interlayer insulating film;

a contact hole opened through said third and second interlayer insulating films to reach said drain electrode;

an embedded conductive layer filled in said contact hole; and

a reflective pixel electrode formed on said third interlayer insulating film, wherein

said reflective pixel electrode is electrically connected to said drain electrode through said embedded conductive layer,

wherein a cross sectional shape of the contact hole is tapered, and

wherein the embedded conductive layer comprises a conductive material dispersed in a medium, the conductive material being selected from the group consisting of carbon, zinc oxide, aluminum, and nickel.

5. (Previously Presented) A semiconductor device comprising:

at least one transistor;

a first interlayer insulating film comprising an organic resin formed over said transistor, said interlayer insulating film having at least one contact hole;

an embedded conductive layer provided to fill said contact hole wherein a top surface of said embedded conductive layer is flush with a top surface of said interlayer insulating film; and

a reflective pixel electrode having a flat upper surface thereon, formed on said interlayer insulating film wherein said reflective pixel electrode is electrically connected to said transistor through said embedded conductive layer, wherein said embedded conductive layer comprises a same resin as said resin of the interlayer insulating film.

6.-15. (Canceled)

16. (Previously Presented) A semiconductor device according to any one of claims 1 and 47-50, further comprising an alignment film.

17.-21. (Canceled)

22. (Previously Presented) A semiconductor device according to claim 1, 2, 3, 4, 5, or 47-50 wherein said device is a display device of a cellular phone.

23. (Previously Presented) A semiconductor device according to claim 1, 2, 3, 4, 5, or 47-50 wherein said device is a display device of a camcorder.

24. (Previously Presented) A semiconductor device according to claim 1, 2, 3, 4, 5, or 47-50 wherein said device is a display device of a portable computer.

25. (Previously Presented) A semiconductor device according to claim 1, 2, 3, 4, 5, or 47-50 wherein said device is a display device of a head mounting display.

26. (Previously Presented) A semiconductor device according to claim 1, 2, 3, 4, 5, or 47-50 wherein said device is a display device of a rear type projector.

27. (Previously Presented) A semiconductor device according to claim 1, 2, 3, 4, 5, or 47-50 wherein said device is a display device of a front type projector.

28.-39. (Canceled)

40. (Previously Presented) A semiconductor device according to any one of claim 1 and 47-50 wherein said device is an EL display device.

41.-45. (Canceled)

46. (Previously Presented) The semiconductor device according to claim 5 wherein said third interlayer insulating film and said embedded conductive layer both comprise an acrylic resin.

47. (Previously Presented) A semiconductor device comprising:

at least one transistor;

at least one interlayer insulating film formed over said transistor, said interlayer insulating film having at least one contact hole;

an embedded conductive layer provided to fill said contact hole wherein a top surface of said embedded conductive layer is flush with a top surface of said interlayer insulating film; and

a reflective pixel electrode having a flat upper surface thereon, formed on said interlayer insulating film wherein said reflective pixel electrode is electrically connected to said transistor through said embedded conductive layer, wherein said embedded conductive layer comprises an indium tin oxide.

48. (Previously Presented) A semiconductor device comprising:

at least one transistor;

at least one interlayer insulating film comprising an organic resin formed over said transistor, said interlayer insulating film having at least one contact hole;

an embedded conductive layer provided to fill said contact hole wherein a top surface of said embedded conductive layer is flush with a top surface of said interlayer insulating film; and

a reflective pixel electrode having a flat upper surface thereon, formed on said interlayer insulating film wherein said reflective pixel electrode is electrically connected to said transistor through said embedded conductive layer,

wherein said embedded conductive layer comprises an indium tin oxide.

49. (Previously Presented) A semiconductor device comprising:

at least one transistor;

a first interlayer insulating film formed over said transistor;

a drain electrode formed on said first interlayer insulating film and electrically connected to a drain of said transistor through an opening of said first interlayer insulating film;

a second interlayer insulating film formed over said drain electrode and said first interlayer insulating film;

a capacitor forming electrode formed on said second interlayer insulating film to form a capacitor between said drain electrode and said capacitor forming electrode;

a third interlayer insulating film formed over said capacitor forming electrode and said second interlayer insulating film;

a contact hole opened through said third and second interlayer insulating films to

reach said drain electrode;

an embedded conductive layer filled in said contact hole; and

a reflective pixel electrode formed on said third interlayer insulating film, wherein said reflective pixel electrode is electrically connected to said drain electrode through said embedded conductive layer,

wherein a cross sectional shape of the contact hole is tapered, and

wherein said embedded conductive layer comprises an indium tin oxide.

50. (Previously Presented) A semiconductor device comprising:

at least one transistor;

a first interlayer insulating film formed over said transistor;

a drain electrode formed on said first interlayer insulating film and electrically connected to a drain of said transistor through an opening of said first interlayer insulating film;

a second interlayer insulating film formed over said drain electrode and said first interlayer insulating film;

a capacitor forming electrode formed on said second interlayer insulating film to form a capacitor between said drain electrode and said capacitor forming electrode;

a third interlayer insulating film comprising an organic resin formed over said capacitor forming electrode and said second interlayer insulating film;

a contact hole opened through said third and second interlayer insulating films to reach said drain electrode;

an embedded conductive layer filled in said contact hole; and

a reflective pixel electrode formed on said third interlayer insulating film, wherein said reflective pixel electrode is electrically connected to said drain electrode through said embedded conductive layer,

wherein a cross sectional shape of the contact hole is tapered, and

wherein said embedded conductive layer comprises an indium tin oxide.

51. (Previously Presented) A device according to claim 1, wherein said medium is an organic material.

52. (Previously Presented) A device according to claim 2, wherein said medium is an organic material.

53. (Previously Presented) A device according to claim 3, wherein said medium is an organic material.

54. (Previously Presented) A device according to claim 4, wherein said medium is an organic material.

55. (Previously Presented) A device according to claim 47, wherein said interlayer insulating film comprises an organic material.

56. (Previously Presented) A device according to claim 48, wherein said interlayer insulating film comprises an organic material.

57. (Previously Presented) A device according to claim 49, wherein at least one of said second and third interlayer insulating films comprises an organic material.

58. (Previously Presented) A device according to claim 50, wherein at least one of said second and third interlayer insulating films comprises an organic material.

59. (Previously Presented) A device according to claim 1, wherein said medium is an inorganic material.

60. (Previously Presented) A device according to claim 2, wherein said medium is an inorganic material.

61. (Previously Presented) A device according to claim 3, wherein said medium is an inorganic material.

62. (Previously Presented) A device according to claim 4, wherein said medium is an inorganic material.

63. (Previously Presented) A device according to claim 47, wherein said interlayer insulating film comprises an inorganic material.

64. (Previously Presented) A device according to claim 48, wherein said

interlayer insulating film comprises an inorganic material.

65. (Previously Presented) A device according to claim 49, wherein said first interlayer insulating film comprises an inorganic material.

66. (Previously Presented) A device according to claim 50, wherein said first interlayer insulating film comprises an inorganic material.

67. (Previously Presented) A device according to claim 1, wherein said interlayer insulating film comprises an organic material.

68. (Previously Presented) A device according to claim 1, wherein said interlayer insulating film comprises an inorganic material.

69. (Previously Presented) A device according to claim 3, wherein said interlayer insulating film comprises an organic material.

70. (Previously Presented) A device according to claim 3, wherein said interlayer insulating film comprises an inorganic material.

71. (Previously Presented) A device according to claim 47, wherein said interlayer insulating film comprises an inorganic material.

72. (Previously Presented) A device according to claim 47, wherein said interlayer insulating film comprises an organic material.

73. (Previously Presented) A device according to claim 49, wherein said interlayer insulating film comprises an inorganic material.

74. (Previously Presented) A device according to claim 49, wherein said interlayer insulating film comprises an organic material.

APPENDIX B

REFERENCES

Copies attached.

APPENDIX C

EVIDENCE APPENDIX

Not applicable.

APPENDIX D

RELATED PROCCEDINGS APPENDIX

Not applicable.